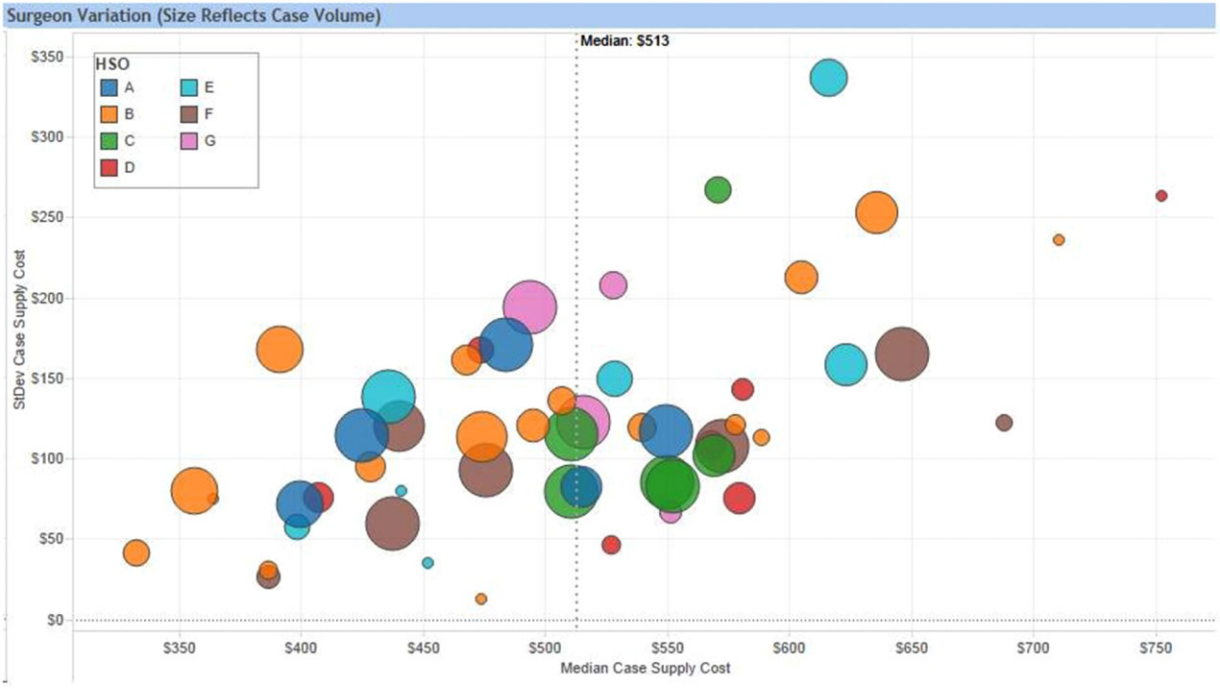
SATURDAY, MARCH 14, 2015, 7:30AM–9:30AM
LONG ORAL F – OUTCOMES

LO-F.01 COST VARIATION IN LAPAROSCOPIC CHOLECYSTECTOMY AND ASSOCIATION WITH OUTCOMES ACROSS A SINGLE HEALTH SYSTEM: IMPLICATIONS FOR STANDARDIZATION AND IMPROVED RESOURCE UTILIZATION

D. Brauer, R. C. Fields, W. G. Hawkins, S. M. Strasberg, L. M. Brunt, N. Mercurio, D. P. Jaques, B. L. Hall
Barnes-Jewish Hospital, Washington University School Of Medicine, St. Louis, MO

Background: Payers and regulatory bodies are increasingly placing emphasis on cost containment, quality/outcome measurement, and transparent reporting. Significant cost variation occurs in many operative procedures without a clear relationship with outcomes. Clear cost-benefit associations will be necessary to justify increased expenditures in the era of bundled payment structures.
Hypothesis: Operating room (OR) supply cost variation in laparoscopic cholecystectomy (LCCK) is not associated with improved outcomes.
Methods: All LCCKs performed within a single health system over a one-year period were analyzed for OR supply cost. Results were obtained for individual surgeons and system hospitals. Costs were correlated with NSQIP outcomes.
Results: From July, 2013–June, 2014, 2,178 LCCKs were performed by 55 surgeons at 7 hospitals. The median case OR supply cost was $513 ± 156. There was significant variation in cost between individual surgeons, hospitals, and within an individual surgeon's practice (Figure). There was no significant correlation between cost and individual surgeon volume, hospital, or NSQIP outcomes. The majority of cost variation was explained by selection of trocar and clip applier constructs.
Conclusions: Significant case OR cost variation is present in LCCK across a single health system. Differences in cost are not associated with individual surgeon volume or hospital and there is no clear association between increased cost and NSQIP outcomes. Placed within the larger context of overall cost, opportunity exists for OR case standardization and savings with no obvious risk for a reduction in quality of care, which is critical in the era of bundled payment structures.

[Correction added on 24 February 2015, after online publication. D. Brauer was added to the list of authors.]



Significant cost variation exists in laparoscopic cholecystectomy across a multi-hospital health system. Each dot represents a single surgeon and dot size is representative of surgeon volume. Each color represents a single hospital. Median case supply cost is plotted on the x-axis. Case supply cost standard deviation is plotted on the y-axis.

LO-F.02 ANALYSIS OF LYMPH NODE POSITIVE PATIENTS IN SURGICALLY TREATED INTRAHEPATIC CHOLANGIOCARCINOMA: A REVIEW OF THE NATIONAL CANCER DATABASE

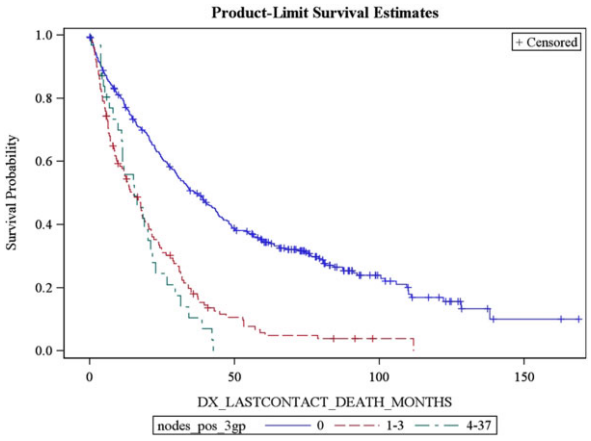
Z. Jutric, C. W. Johnston, H. M. Hoen, P. H. Newell, M. A. Cassera, C. W. Hammill, R. F. Wolf, P. D. Hansen
Providence Portland Cancer Center, Portland, OR

Introduction: The role of routine lymphadenectomy in the surgical treatment of intrahepatic cholangiocarcinoma (ICC) has been poorly defined. Recent studies have recommended consideration of lymphadenectomy given its prognostic implications. We aim to define predictive indicators of survival in patients with positive lymph nodes.

Methods: The National Cancer Data Base (NCDB) was queried for patients who underwent surgical resection for ICC between 1998 and 2011. Single predictor univariate analyses were performed on 23 variables including demographics, tumor characteristics, surgery outcomes and adjuvant therapy details. Both single predictor univariate and multivariate Cox proportional hazards survival analysis were then performed on 160 patients identified to have positive lymph nodes.

Results: Of 823 patients with complete data, 57% had at least one lymph node examined. Median survival for lymph node negative patients was 37 months versus 15 months for lymph node positive patients, results shown. Other univariate factors associated with decreased survival include male sex, urban location, tumor size, grade and positive margin status. In lymph node positive patients, multivariate analysis showed poorer survival in the patients not receiving chemotherapy or radiation (HR 1.43, $p = .006$), tumor size >5 cm compared to <5 cm ($p = .018$), and older age ($p < .0001$). Lymph node positive patients <age 45 had a median survival of 27 months.

Conclusions: Overall survival in most ICC patients with lymph node metastases is limited. Adjuvant therapy should be considered in these patients. Strategies to improve lymph node staging deserve further study, as many of these patients may not benefit from resection.



LO-F.03 NATURAL HISTORY AND TREATMENT TRENDS IN HEPATOCELLULAR CARCINOMA SUBTYPES: INSIGHTS FROM A NATIONAL CANCER REGISTRY

P. L. Jernigan, K. Wima, D. J. Hanseman, R. S. Hoehn, A. Ertel, E. Midura, I. M. Paquette, S. A. Ahmad, S. A. Shah, D. E. Abbott
Department Of Sugery, University Of Cincinnati School Of Medicine, Cicinnati, OH

Introduction: Histopathological advancements have enabled more sophisticated characterization of hepatocellular carcinoma (HCC), but the clinical significance of these distinctions is incompletely understood. Our aim was to investigate pathologic and treatment differences between HCC variants.

Methods: The American College of Surgeons National Cancer Data Base (1998–2011) was queried to identify 784 patients with surgical management of six HCC subtypes (1.8% of all HCC patients): fibrolamellar (FL, $n = 206$), scirrhous (Sc, $n = 29$), spindle cell (Sp, $n = 20$), clear cell (CC, $n = 169$), mixed type (M, $n = 291$), and trabecular (T, $n = 69$). Chi-square, Kaplan-Meier and Cox regression analysis were used to identify associations between demographic, tumor and treatment-specific variables and clinical outcomes, namely overall survival (OS).

Results: Patients with FL-HCC were younger than other variants (median age 27 vs. 54–61, $p < 0.001$), more commonly female (56.3%, $p < 0.001$), and less likely to receive a transplant (3.66%, $p < 0.001$). Patients with FL- and Sp-HCC presented more frequently with larger tumors (>5 cm, $p < 0.001$) and node-positive disease ($p < 0.001$). Median OS (years) of the six subtypes was: FL 2.99 (CI 2.08–4.55), Sc 4.12 (1.47–7.01), Sp 0.56 (0.13–1.04), CC 2.99 (2.08–4.55), M 2.22 (1.61–2.7), and T 2.91 (1.88–8.86). On multivariate analysis, better OS was associated with FL-HCC, lower pathologic stage, node-negative disease, and liver transplant (Table 1). Eighty-six patients (11%) received adjuvant therapy, which was not associated with better OS.

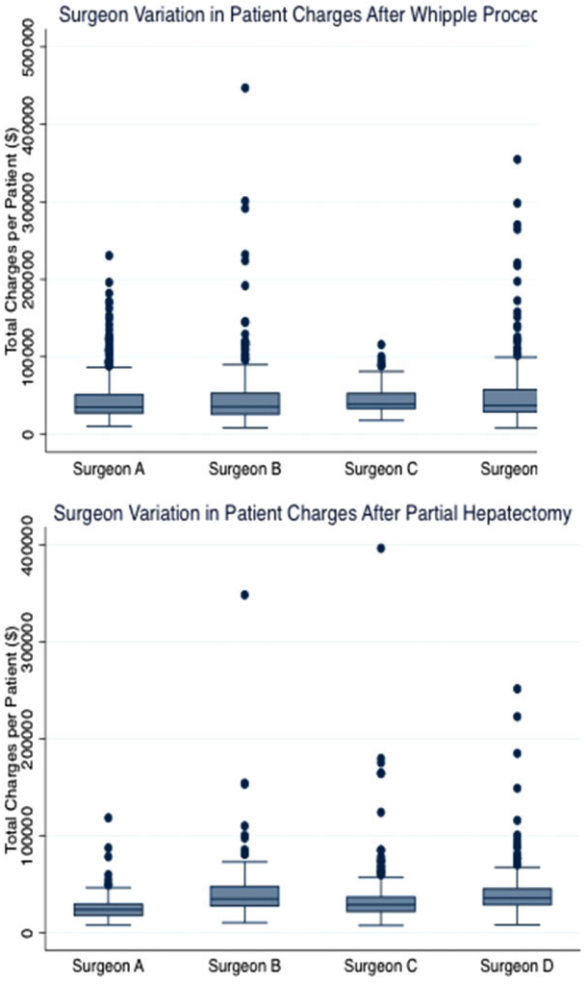
Conclusion: These data represent the largest series of recognizable HCC variants, demonstrating distinct differences in presentation and natural history. These findings can help clinicians and patients discuss treatment decisions and prognosis for rare clinical entities.

Variable (n)	Hazard Ratio for Overall Survival	95% CI	p-value
Histology			
Trabecular (69)	1.00	Reference	
Fibrolamellar (206)	0.36	(0.21 - 0.62)	<0.001
Clear cell (169)	1.10	(0.64 - 1.89)	0.729
Mixed (291)	1.35	(0.85 - 2.14)	0.206
Surgical Treatment			
Transplant (140)	1.00	Reference	
Resection (544)	1.72	(1.15 - 2.55)	0.008
Local Ablation (17)	3.07	(1.34 - 7.01)	0.008
Nodal Status			
Negative (245)	1.00	Reference	
Positive (90)	1.87	(1.19 - 2.92)	0.006
Pathologic Stage			
Stage I (240)	1.00	Reference	
Stage II (215)	1.88	(1.19 - 2.96)	0.007
Stage III (229)	3.05	(1.98 - 4.70)	<0.001
Stage IV (100)	3.83	(2.32 - 6.32)	<0.001

LO-F.04 UNDERSTANDING DRIVERS OF COST VARIATION FOR EPISODES OF CARE AMONG PATIENTS UNDERGOING HEPATOPANCREATOBILIARY SURGERY

G. Spolverato, A. Ejaz, N. Ahuja, K. Hirose, M. A. Makary, C. L. Wolfgang, M. J. Weiss, J. Cameron, T. Pawlik
Johns Hopkins Hospital, Baltimore, MD

Background: Understanding factors associated with variation in procedure-related costs may help identify means to increase savings. We sought to define potential variation in hospital charges associated with hepatopancreatobiliary (HPB) surgery.
Methods: Patients who underwent a HPB procedure between 2009–2013 were identified. Perioperative morbidity was ascertained through ICD-9 codes. Total hospital charges were tabulated for room&board, surgical/anesthesia services, medications, laboratory/radiology services, and other charges.
Results: 2,545 patients underwent either a pancreas(66.8%) or liver/biliary(33.2%) resection. Mean total charges for all patients were $42,357 ± $33,745(pancreas: $46,352 ± $34,932 vs. liver: $34,303 ± $29,639;P < 0.001). Major morbidity(pancreas, range: 7%-18%; liver, range: 9%-18%) and observed : expected(O : E) length-of-stay(LOS) (pancreas, range: 0.67–1.64; liver, range: 1.06–3.35) varied among providers(both P < 0.001). While a perioperative complication resulted in increased total hospital charges(complication: $66,401 ± $55,124 vs. no complication: $39,668 ± $29,250;P < 0.001), total charges remained variable even among patients who did not experience a complication(P < 0.001). For example, mean total charges for a pancreaticoduodenectomy ranged from $41,413-$49,543 vs. $29,376-$43,420 for a partial hepatectomy (Figure). Surgeons within the lowest quartile of O : E LOS had lower total charges($33,879 ± $27,398) versus surgeons in the highest quartile($49,498 ± $40,971)(P < 0.001). Surgeons with the highest O : E LOS had higher across-the-board charges (operating room, highest quartile: $10,514 ± $4,496 vs. lowest quartile: $7,842 ± $3,706; medication, highest quartile: $1,796 ± $3,799 vs. lowest quartile: $925 ± $2,211; radiology, highest quartile: $2,494 ± $4,683 vs. lowest quartile: $1,424 ± $3,247; laboratory, highest quartile: $4,236 ± $5,991 vs. lowest quartile: $3,028 ± $3,804; all P < 0.001).
Conclusions: After accounting for in-hospital complications, total mean hospital charges for HPB surgery remained variable by case type and provider. While the variation in cost was associated with LOS, provider-level differences in across-the-board charges were also noted.



LO-F.05 AN ECONOMIC ANALYSIS OF PANCREATICODUODENECTOMY: SHOULD COSTS DRIVE CONSUMER DECISIONS?

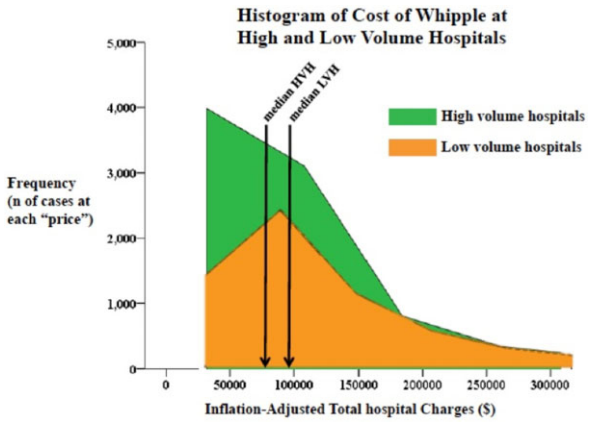
T. B. Tran, M. M. Dua, D. J. Worhunsky, G. A. Poultsides, J. A. Norton, B. C. Visser
Stanford University School Of Medicine, Stanford, CA

Background: Consumer groups campaign for cost transparency believing that patients will select hospitals accordingly. The aim of this study was to determine whether the "cost" of a Whipple might be considered in choosing a hospital.
Methods: Using Nationwide Inpatient Sample Database, we analyzed charges for patients who underwent pancreaticoduodenectomy (PD) from 2000–2010. Outcomes were compared between high volume hospitals (HVH, >20/yr) and

low volume hospitals (LVH). The relationship of inflation-adjusted charges and outcomes were stratified by uncomplicated PD (length of stay <14 days) vs complicated PD (>14 days).

Results: A total of 15,599 PD were performed in 1,186 hospitals at a median cost of $87,444 (IQR $60,015-$144,869). While only 94 (8%) hospitals performed >20 PD/year, 57% of all PD were performed in these HVH. HVH had shorter hospital stay (11 vs 15 days, $p < 0.001$) and mortality (3% vs 7.6%, $p < 0.001$). PD performed at LVH had higher median charges compared to HVH ($97,923 vs. $81,581, $p < 0.001$). The cost of uncomplicated PD was significantly lower than a complicated PD ($67,238 (IQR 51,112–91,401) vs $138,325 (IQR 95,206–224,919), $p < 0.001$). When comparing uncomplicated PD between HVH and LVH, the median cost was very similar ($67,389 vs $66,922). Among uncomplicated PD, a multivariate analysis controlling for demographics and co-morbidities revealed that cost did not affect the risk of mortality (OR 1).

Conclusions: The cost of a Whipple (even uncomplicated) remains surprisingly variable. PD at HVH are associated with better outcomes, which is reflected in lower charges. But ultimately, patients should choose volume over price.



remains unclear. We sought to examine the association between RBCT and post-operative morbidity following pancreatectomy.

Methods: Using the ACS-NSQIP database, we identified patients undergoing elective pancreatectomy from 2006 to 2012. Patients missing data on key variables were excluded. We compared post-operative morbidity and length of stay based on RBCT status using univariate and multivariate analyses. A sensitivity analysis was conducted excluding patients with higher baseline risk for RBCT.

Results: From 21,132 pancreatectomies, we included 14,322 patients of whom 1624 (11.3%) received RBCT. Major morbidity (34.9% Vs. 21.6%; $p < 0.0001$) and mortality (15.7% Vs. 11.5%; $p < 0.0001$) were higher, and median length of stay was prolonged (15.7 Vs. 11.5 days; $p < 0.0001$) with RBCT. After adjustment for baseline characteristics including comorbidities, malignant diagnosis, procedure, and operative time, RBCT was independently associated with increased major morbidity (Relative Risk – RR 1.45; $p < 0.0001$), post-operative infections (RR 1.30; $p < 0.001$), thrombo-embolic events (RR 1.41; $p = 0.01$), cardiac events (RR 2.41; $p < 0.0001$), respiratory failure (RR 2.60; $p < 0.0001$), and mortality (RR 2.51; $p < 0.0001$). Length of stay was prolonged with RBCT (adjusted mean estimate 1.22; $p < 0.0001$). Excluding patients with higher baseline risk of RBCT did not substantially alter the results.

Conclusion: Perioperative RBCT is independently associated with worse short-term outcomes and prolonged length of stay following pancreatectomy. This observation holds true in patients with lower baseline risk of RBCT. Comprehensive multidisciplinary strategies to minimize and rationalize the use of RBCT are warranted.

Association between perioperative RBCT and post-operative outcomes, for the entire cohort of patients.

Outcomes	Unadjusted			Adjusted*		
	Relative Risk	95%CI	p value	Relative Risk	95%CI	p value
Major morbidity+	1.61	1.50-1.74	<0.0001	1.45	1.34-1.57	<0.0001
Post-operative infections+	1.41	1.30-1.53	<0.0001	1.30	1.20-1.42	<0.0001
Thrombo-embolic events¶	1.65	1.29-2.13	<0.0001	1.41	1.08-1.83	0.01
Cardiac events¶	3.00	2.25-4.00	<0.0001	2.41	1.78-3.26	<0.0001
Respiratory failure¶	3.36	2.87-3.93	<0.0001	2.65	2.25-3.14	<0.0001
Mortality¶	3.18	2.48-4.07	<0.0001	2.51	1.93-3.27	<0.0001

RBCT: Red Blood Cell Transfusion; CI: Confidence Interval
* Adjusted for: age, gender, race, body mass index, ASA class, pre-operative anemia (Hb <130g/L), bilirubin, and INR, cardiac comorbidities, bleeding disorder, malignant diagnosis, procedure, and operative time.
+ Modified Poisson regression
¶ Logistic regression

LO-F.06 THE IMPACT OF PERIOPERATIVE BLOOD TRANSFUSION ON SHORT-TERM OUTCOMES FOLLOWING PANCREATECTOMY: AN ANALYSIS FROM THE AMERICAN COLLEGE OF SURGEONS NATIONAL SURGICAL QUALITY IMPROVEMENT PROGRAM (ACS-NSQIP)

J. Hallet[1,2], A. L. Mahar[3], M. Tsang[2], C. H. Law[1,2], N. G. Coburn[1,2], P. J. Karanicolas[1,2]
[1]Division Of General Surgery, Sunnybrook Health Sciences Centre – Odette Cancer Centre, Toronto, ONTARIO; [2]Department Of Surgery, University Of Toronto, Toronto, ONTARIO; [3]Department Of Public Health Sciences, Queen's University, Kingston, ONTARIO

Background: While perioperative red blood cell transfusions (RBCT) are associated with worse outcomes in colorectal surgery, their impact following pancreatectomy

LO-F.07 RESECTION OF COLORECTAL CANCER LIVER METASTASES IN THE SETTING OF EXTRAHEPATIC DISEASE; RESULTS FROM A RANDOMIZED TRIAL EVALUATING THE EFFECT OF PET-CT

P. E. Serrano[1], C. Moulton[2], C. Gu[1], C. H. Law[3], L. Ruo[1], K. Y. Gulenchyn[1], D. Quan[4], R. Fairfull Smith[5], D. W. Jalink[6], M. Husien[7], J. A. Julian[1], M. N. Levine[1], S. Gallinger[2]
[1]McMaster University, Hamilton, ON; [2]University Health Network, University Of Toronto, Toronto, ON; [3]Sunnybrook Health Sciences Centre And Odette Cancer Centre, Toronto, ON; [4]London Health Sciences Centre, London, ON; [5]The Ottawa Hospital, Ottawa, ON; [6]Cancer Centre Of Southeastern Ontario, Kingston, ON; [7]Grand River Regional Cancer Centre, Kitchener, ON

Introduction: Selected patients with colorectal cancer liver metastases (CRLM) and extra-hepatic disease (EHD) are considered for curative surgery. The main objective of this

study was to evaluate the oncologic outcomes of patients with specified CRLM-EHD vs. CRLM-only and to determine the effect of PET-CT on disease-free (DFS) and overall survival (OS).

Methods: This is a sub-study of a randomized trial studying the effect of PET-CT before liver resection on surgical management of CRLM with or without EHD (limited to specified resectable metastases: portal lymph nodes/lung/local recurrence) in patients with resected colorectal cancer from 2005–2013. Survival data adjusted for PET-CT was analyzed using standard statistics.

Results: From 404 patients in the trial, 25 had EHD at randomization [14 PET-CT group and 11 control (no PET-CT)]. The most common EHD-site was lung (n = 18). All EHD sites known at randomization were resected (PET-CT and control group). After median follow-up of 36-months, median DFS for CRLM-EHD was 5.9-months (95%CI: 3.6–11.7) and 16.2-months (95%CI: 13.7–18.9) for CRLM-only [unadjusted-HR: 3.03 (95%CI: 2.00–4.59)]; the estimated OS was similar between groups [36.7-months (95%CI: 26.8–43.4) vs. 40.7-months (95%CI: 40.5–57) respectively; unadjusted-HR: 1.68 (95%CI: 0.98, 2.89)]. After adjusting for the use of PET-CT, DFS for CRLM-EHD remained significantly worse compared to CRLM-only without significant differences in the adjusted OS.

Conclusions: Metastasectomy for specified and limited CRLM-EHD is associated with similar OS to CRLM-only despite a lower DFS. The use of PET-CT prior to complete metastasectomy did not affect the time to recurrence or the OS of patients with CRLM-EHD.

LO-F.08 TIMING, INCIDENCE, AND RISK FACTORS ASSOCIATED WITH UNPLANNED POSTOPERATIVE HOSPITAL READMISSIONS IN THE HEPATO-PANCREATICO-BILIARY PATIENTS

G. C. Edwards[1], L. Du[1], J. R. Miller[2], J. Ehrenfeld[1], H. R. Mir[1], Y. Shyr[1], A. A. Parikh[1], N. B. Merchant[1], K. Idrees[1]

[1]*Vanderbilt University Medical Center, Nashville, TN;*
[2]*Meharry Medical College, Nashville, TN*

Introduction: As part of the Affordable Care Act, the Hospital Readmissions Reduction Program (HRRP), has started to impose financial sanctions on hospitals with increased readmission rates. The purpose of this study is to define the incidence and identify peri-operative factors associated with 30 and 90-day readmission after hepatic (HR) and pancreatic resections (PR).

Methods: HR and PR patients were retrospectively reviewed over an 8 year period. Pre-operative factors [patient demographics, ASA class, Charlson Comorbidity Index, Elixhauser Comorbidity Index], intra-operative factors [Surgical Apgar Score (SAS), operative duration] and post-operative factors [postoperative major complications (PMC), hospital length of stay (LOS), ICU LOS, discharge disposition] were evaluated. Multivariable Cox regression (MVR) analysis was used to examine associations for hospital readmission.

Results: 30 and 90-day readmission rates in 878 patients are shown in the table. By MVR, PMC (HR = 8.9, 95%, p = 0.0003), PR (HR = 2.3, p = 0.006), ICU LOS (HR = 1.1, p = 0.02) and SAS (HR = 0.75, p = 0.02) were associated with 30-day readmission. PMC (HR = 7.5, p = 0.0001) and PR (HR = 2.1, p = 0.007) were also associated with 90-day readmission. In patients without complications, ICU LOS (HR = 7.0, p = 0.03), PR (HR = 2.4, p = 0.006) and SAS (HR = 0.7, p = 0.04) were independently associated with 30-day readmission while only PR (HR = 2.1, p = 0.007) was associated with 90-day readmission.

Conclusions: The 90-day readmission rate in HPB patients remains high (18.8%) and the majority of readmissions (88.8%) occur within 30 days of discharge. Identifying factors associated with an increased risk of readmission is critical in the development of interventions and resource utilization to help reduce unplanned readmissions and decrease costs within this population.

	30-day Readmission	31-90 day Readmission
All (n=878)	146 (16.6%)	19 (2.2%)
Pancreatic resections (PR) , n=413	90 (21.2%)	15 (3.6%)
Hepatic resections (HR), n=465	56 (12%)	2 (0.9%)
Complications (PMC) group, n=144	86 (41.6%)	17 (11.8%)
No complications (no PMC) group, n=734	60 (11.7%)	2 (0.3%)

LO-F.09 MISSING THE OBVIOUS: PSYCHOSOCIAL OBSTACLES IN VETERANS WITH HCC

K. J. Hwa[1,2], M. M. Dua[1,2], S. M. Wren[1,2], B. C. Visser[1,2]
[1]*Stanford University School Of Medicine, Stanford, CA;*
[2]*Palo Alto Veterans Affairs Hospital, Palo Alto, CA*

Introduction: Socioeconomic disparities in patients with hepatocellular carcinoma (HCC) influence medical access and treatment. However, in addition to socioeconomic barriers, the veteran population suffers from significant psychosocial obstacles. This study identifies the often overlooked social challenges that veterans face while undergoing treatment for HCC.

Methods: We retrospectively reviewed prospectively gathered data regarding social/behavioral hardships for 100 veterans at the Palo Alto VA who had been treated for HCC between 2009–2014 (50 consecutive patients who underwent resection and 50 treated with intra-arterial therapy).

Results: Substance abuse history was identified in 96%, with 34% actively abusing alcohol or drugs. Half were unemployed. Most patients survived on very limited income (median $1340/mo, IQR $900–2125); 36% on <$1000/mo, 37% between $1001–2000/mo, and 27% with >$2000/mo. Fully, 37% were homeless at time of index treatment, which was more common in those with the lowest income (62% of <$1K/mo group, 32% of $1–2K/mo group, and 6% of >$2K/mo group, p < 0.05). Psychiatric illness was present in 64/100 (64%) patients; among these the majority (59/64, 92%) received ongoing psychiatric treatment. The top two diagnoses were depression and PTSD. Fifty-one percent of all patients had been incarcerated. Transportation was provided to 23% of patients who would otherwise have been unable to attend medical appointments.

Conclusions: Psychiatric disease and substance abuse are highly prevalent among veterans with HCC. Most patients are surviving on very meager income. These profound socio-economic and psychosocial problems must be recognized when providing care for HCC to this population to provide adequate treatment and surveillance.

SATURDAY, MARCH 14, 2015, 7:30AM–9:30AM LONG ORAL G – BASIC/ TRANSLATIONAL/EDUCATION

LO-G.01 TAUROURSODEOXYCHOLIC ACID ALLEVIATES ISCHEMIA/ REPERFUSION INJURY IN STEATOTIC MOUSE LIVER

C. D. Anderson, J. Zhang, N. Singh, W. Dorsett-Martin, T. M. Earl
University Of Mississippi Medical Center, Jackson, MS

Background: Tauroursodeoxycholic acid (TUDCA) decreases endoplasmic reticulum (ER) stress, autophagy, and cell death in cultured rat hepatocytes. We hypothesized that TUDCA could reduce the injury caused by total warm ischemia reperfusion (WIR) in steatotic mouse liver.
Methods: Male ob/ob mice underwent 100% hepatic warm ischemia by clamping the portal triad for 30 minutes. For the experiment group, 200 mg/kg TUDCA was injected IP 1 hour before the surgery. Animals were sacrificed at 12 hours and 48 hours after reperfusion. Quantitative real time PCR measured ER stress markers such as C/EBP homologous protein (CHOP), glucose regulated protein 78 (GRP78), protein kinase dsRNA-dependent-like ER kinase (PERK), and activating transcription factor-6 (ATF6). Western blot examined autophagy marker microtubule-associated protein 1 light chain 3 (LC3 II). ELISA determined interleukine-6 (IL6) levels (liver and serum).
Results: Compared to controls, WIR increased ER stress in the liver [CHOP (~3 fold, $p = 0.004$), GRP78 (~4 fold, $p = 0.001$), PERK (~2 fold, $p = 0.005$), and ATF6 (~1.5 fold, $p = 0.004$)] at 12 but not 48 hours. LC3 II protein levels were increased at both 12 (~3 fold, $p = 0.019$) and 48 hours (~4 fold, $p = 0.025$). Serum IL6 levels were increased at 12 (~40 fold, $p = 0.034$) and 48 hours (~33 fold, $p = 0.034$). TUDCA treatment decreased LC3 II at 12 ($p = 0.018$) and 48 hours ($p = 0.034$), decreased serum IL6 at 12 ($p = 0.025$) and 48 hours ($p = 0.025$), and improved animal survival (median 26 hours vs 41 hours, $p = 0.02$). ER stress levels were not changed.
Conclusion: TUDCA improves survival and reduces the inflammation following WIR in steatotic liver through a non-ER stress pathway.

LO-G.02 CHARACTERIZATION OF A PORCINE MODEL FOR ASSOCIATING LIVER PARTITION AND PORTAL VEIN LIGATION FOR STAGED HEPATECTOMY (ALPPS)

K. P. Croome, S. A. Mao, J. M. Glorioso, S. L. Nyberg, D. M. Nagorney
Mayo Clinic, Rochester, MN

Background: Publications using the ALPPS procedure have demonstrated a future liver remnant(FLR) growth of 40–160% in only 6–9 days. The present study aimed to develop and describe the first large animal model of ALPPS that can be used for future studies.
Methods: A total of 13 female domestic swine were studied. ALPPS stage 1 (portal vein division and parenchymal transection) was followed by ALPPS stage 2 (completion left extended hepatectomy) 7 days later. An abdominal CT scan was performed immediately prior to ALPPS stage 1 surgery and again 7 days later to assess hypertrophy immediately prior to ALPPS stage 2 surgery. Blood samples as well as tissue analysis were performed.
Results: On CT volumetric analysis mean size of the FLR prior to ALPPS stage 1 was $21.4 \pm 1.8\%$ and $39.8 \pm 4.6\%$ prior to ALPPS stage 2. Median degree of hypertrophy was 74.5% with a median kinetic growth rate of 10.6% per day. Liver weights at autopsy correlated well with CT volumetric analysis($p = 0.65$). There was no significant difference in mean lab values (AST,ALT,ammonia,INR or bilirubin) from baseline until immediately prior to ALPPS stage 2. Post ALPPS stage 2 there was a significant increase in INR from baseline 1.1 ± 0.1 and 1.6 ± 0.1 ($p = 0.005$), respectively. No post-operative deaths secondary to liver failure were observed.
Conclusion: The present study describes the first reproducible large animal model of the ALPPS procedure. Degree of hypertrophy and kinetic growth rate were similar to that which has been demonstrated in human publications. This model will be valuable as future laboratory studies are performed.

LO-G.03 PREOPERATIVE ANAEMIA AND POSTOPERATIVE OUTCOMES AFTER HEPATECTOMY: A RETROSPECTIVE COHORT STUDY

S. Tohme, P. Varley, M. Khreiss, A. Tsung
University Of Pittsburgh, Pittsburgh, PA

Background: Preoperative anemia is associated with adverse outcomes after surgery in general but outcomes after hepatectomy specifically are not well established. We aimed to assess the effect of preoperative anemia on 30-day post-operative morbidity and mortality in patients undergoing major hepatectomies.
Methods: All elective hepatectomies for the period 2005–2012 recorded in the NSQIP database were evaluated. We selected to study partial lobectomies, total left, total right, and trisegmentectomies and exclude minor procedures. We obtained anonymized data for 30-day mortality and morbidity, demographics, and preoperative and perioperative risk factors. We used multivariate logistic regression to assess the